


Chapter 5




Fixed Gear Sampling

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I. Introduction

Thirty percent of WCGOP observer days are spent on fixed gear vessels. These vessels target sablefish, thornyheads, rockfish, cabezon, lingcod, and a variety of other nearshore species. Fixed gear catch is generally more homogeneous, with only the target and a few bycatch species being caught on a set. Trips aboard fixed gear vessels range from one to ten days.

II. Diversity of Fleet and Effects on Sampling

The fixed gear fleet on the West Coast is very diverse. Therefore, there are two manual sections devoted to sampling on fixed gear vessels: Chapter 5, “Fixed Gear Sampling” and Chapter 6, “Fixed Gear Sampling on Small Boats”. Observer sampling aboard all fixed gear vessels follows a consistent protocol. However, characteristics including vessel size, target fishery, and average landing weight affect observer sampling. Below is a list of characteristics that influence catch sampling. Under each characteristic is an explanation of what is covered in Chapter 5, “Fixed Gear Sampling” versus Chapter 6, “Fixed Gear Sampling on Small Boats”.

Fixed gear vessels range in size from kayaks to 70’.

- **Size** – Although the amount of catch on fixed gear vessels is usually small, limited deck space may cause difficulties when sampling. Lack of storage space for catch can affect sample size and often there is not room for a platform scale, making it necessary to rely on hand scales.
 - **Chapter 5, “Fixed Gear Sampling”** - Generally vessels ranging in size from 35 feet to 70 feet. Platform scale can be used.
 - **Chapter 6, “Fixed Gear Sampling on Small Boats”** – Generally vessel ranging in size from

kayaks to 35 feet. Platform or hand scales might be used.

Fixed gear vessels land between 50 lbs. and 10,000 lbs. per trip.

- **Landing Weight** – The majority of fixed gear vessels participate in the open access portion of the fishery. Open access vessels may catch less than 100 pounds of fish per day. However, there are also Limited Entry fixed gear vessels that land thousands of pounds per trip.
 - **Chapter 5, “Fixed Gear Sampling”** - Generally land over 1500lbs in a single delivery.
 - **Chapter 6, “Fixed Gear Sampling on Small Boats”** – Generally land 50 to 500 lbs in a single delivery
- **Gear** – There are many gear types employed in the West Coast Fixed Gear fisheries.
 - **Chapter 5, “Fixed Gear Sampling”** - Conventional longline and strings of pots.
 - **Chapter 6, “Fixed Gear Sampling on Small Boats”**– Vertical longline (portuguese set), stick, cable, troll, rod-and-reel, and individual pots or traps.
- **Live vs. Dead** – Many vessels participate in the live fish fishery. Skippers vary on their willingness to have the observer weigh live retained fish. In a number of fisheries, including the live fish and dory fleets, discard is frequently released alive. This requires the observer to be conscientious about not increasing the mortality of discard.
 - **Chapter 5, “Fixed Gear Sampling”** - Dead fish fishery.
 - **Chapter 6, “Fixed Gear Sampling on Small Boats”** – Live or dead fish fisheries.
- **Total # of Hooks** – Counting hooks can be tricky. On certain gear types, this means not only counting the number of hooks/skates/poles/tubs/etc. but also

Total # of Hooks for the Trip Form = the total number of hooks or pots for that set

counting the number of times each skate/pole/tub/etc. is brought above the waterline.

- **Chapter 5, “Fixed Gear Sampling”** - Over 1500 hooks set in a day. Large sections of gear retrieved in sets with discernible start and end points.
- **Chapter 6, “Fixed Gear Sampling on Small Boats”** – Fewer total hooks fished. Small sections or pieces of gear set and retrieved repeatedly throughout day.
- **Sets** – Longline gear or strings of pots are easily defined as a set. However, in many of the other fisheries defining a set is difficult. In these fisheries sets are often defined by geographic area, depth, gear type, and species composition. If none of those factors change during a day of fishing, then all gear pulled that day is considered one set.
 - **Chapter 5, “Fixed Gear Sampling”** - Easily defined sets with start and end buoys.
 - **Chapter 6, “Fixed Gear Sampling on Small Boats”**– Small sections or pieces of gear set and retrieved repeatedly throughout day. Sets are often determined by location, depth and time.

Groundline/Mainline -

The length of line to which all of the hooks are attached. This line is the “backbone” of the longline gear.

Gangion-

The length of line that connects the hook to the groundline. It is often one to two feet long.

Skates/Tubs – A segment of longline gear. Skates/tubs are tied together to form a set.

III. Fixed Gear and Fishing Strategy Descriptions

Longline Gear

This gear type involves the setting out of a long horizontal line (**groundline/mainline**) to which other short lines (**gangions**) with baited hooks are attached. The groundline is secured between anchored lines and identified by floating surface buoys, bamboo poles, and flags. The groundline is laid along or just above the ocean floor (bottom longline) (See Figure 5-1).

Longline fishers usually further divide their gear into smaller segments in order to handle it aboard the vessel. A “set” consists of several segments of gear with the groundlines tied to one another. Segments of gear are usually referred to as **skates** or **tubs**.

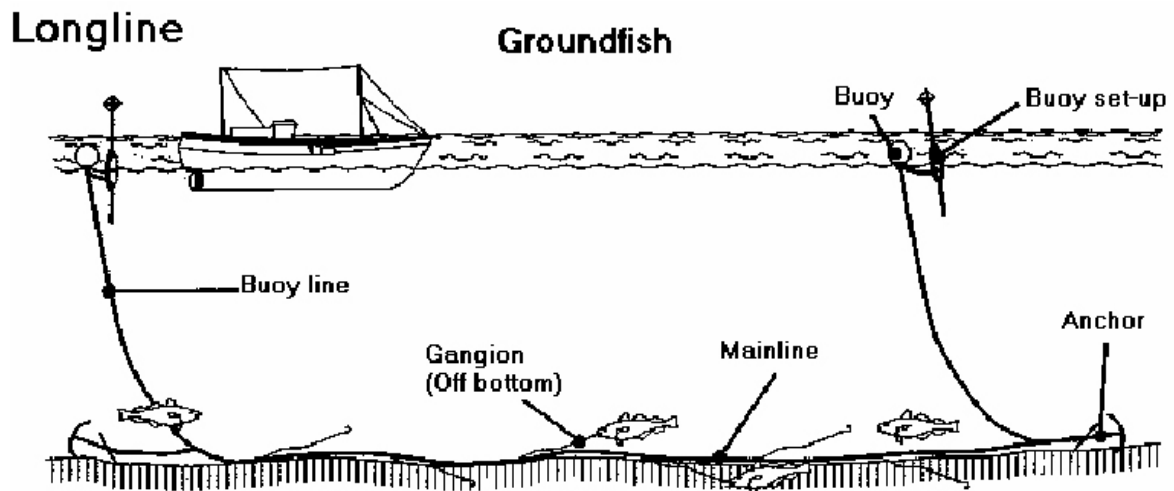


Figure 5-1: Longline Gear Set-Up

To deploy longline gear, the vessel sets the first anchor and then steams ahead, following a selected pathway with the groundline and baited hooks being set off the stern of the boat. Hooks are usually baited by hand with squid, herring, octopus, or cod. Hooks of various sizes are attached to gangions of various lengths that are tied on or snapped onto the line at desired intervals. Hook size and spacing, depth, and soak time (fishing time) vary.

Block - A hydraulically driven wheel into which the groundline is placed during gear retrieval. As the wheel spins the groundline is drawn aboard.

Rollerman - A crewman who stands where the fish are coming in and brings them aboard using a gaff. The rollerman lands any commercially valuable fish and excludes any non-commercially valuable fish from being landed.

Longline gear is retrieved by pulling in the groundline and landing one gangion and hook at a time. On most longliners (See Figure 5-2), the vessel pulls the buoy aboard then pulls up the anchor using a **block**. The **rollerman** transfers the groundline to the block and begins hauling the groundline. The line comes in over the rollers, through the **crucifier**, over the block, and then is coiled. A rollerman stands at the

Crucifier - A pair of rollers or steel pegs which stand vertically with only enough room for the groundline to pass between. During gear retrieval, the groundline passes between the rollers and the hooks are pulled out of the fish.

railing of the vessel and helps the fish aboard. Some longliners on the West Coast manually pull the buoy, anchor and groundline aboard. Sablefish, Pacific halibut, spiny dogfish, and other groundfish are often targeted with longline gear.

Snap Gear

Snap, or tube, gear is a variation on longline gear. On snap gear, the gangions are “snapped” onto the groundline as it is being set. The gangions are typically garden hose but monofilament line is also used. Snap gear does not have skates, which is the most significant difference between it and conventional longline gear.

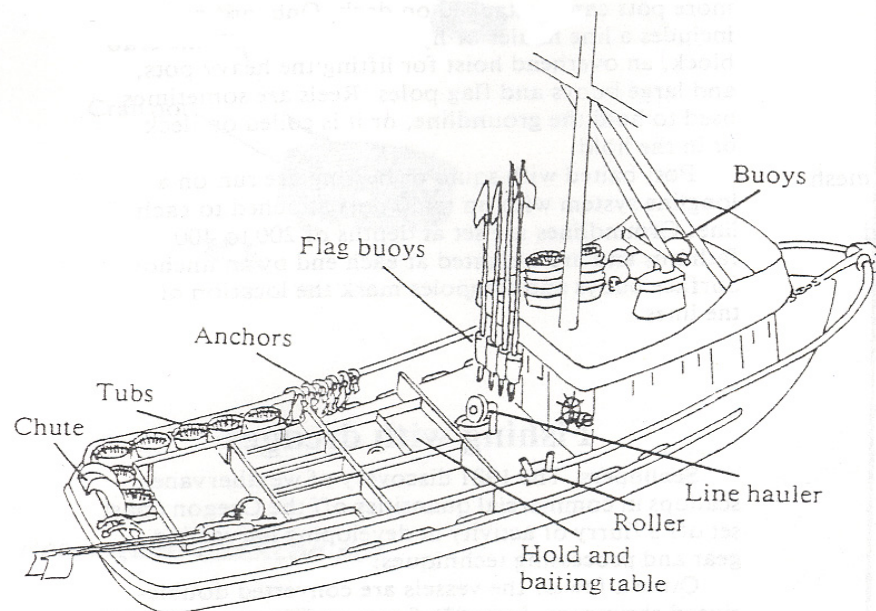


Figure 5-2: Longline Vessel

Boats that use this gear type typically have a large drum on the back of the vessel that carries all the groundline. They set just as conventional longliners but typically have a tub of baited gear on the stern and snap on the tubes as the gear is being set.



Pots

The words “pot” and “trap” are used interchangeably to mean baited cages set on the ocean floor to catch fish and shellfish. They can be circular, rectangular or conical in shape. The pots may be set out individually or as strings with multiple pots attached to a groundline. Larger vessels tend to set gear in strings of pots (Chapter 5, “Fixed Gear Sampling”) whereas smaller vessels typically set traps individually (Chapter 6, “Fixed Gear Sampling on Small Boats”). All pots contain entry ports and escape ports that allow undersized or unwanted species to escape. Additionally, all pots must have biodegradable escape panels or fasteners that prevent the pot from continuing to fish if lost.

Strings of pots are marked at each end with a pole and flag, and sometimes a light or radar reflector. Individual pots are marked with surface buoys.

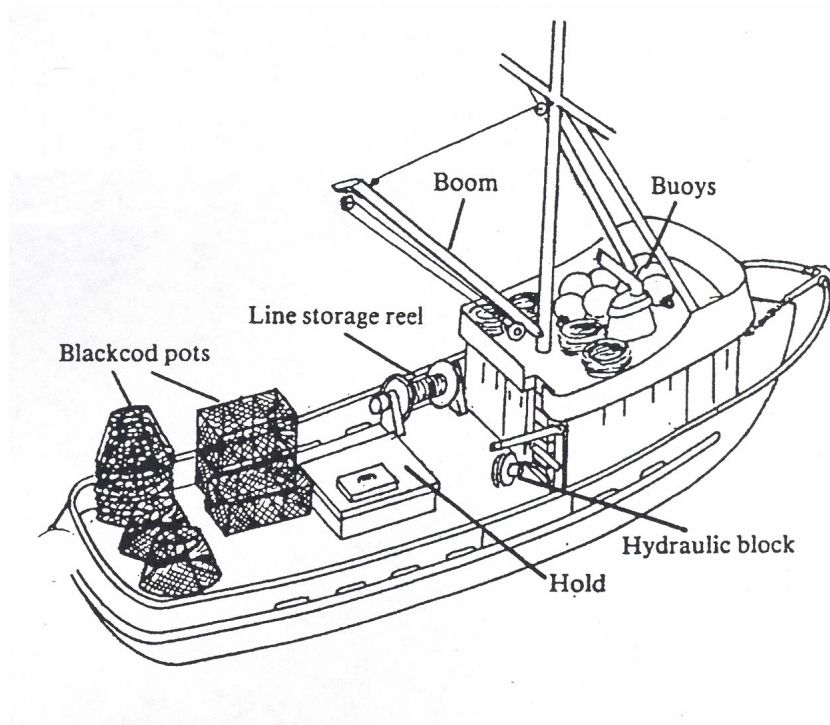


Figure 5-3: Trap Vessel

Sablefish Pots



Sablefish pots are fished in strings weighted with anchors at each end and marked at the surface with buoys and flagpoles. The pots are rectangular, trapezoidal, basket, or cylindrical in shape and usually weigh less than 50 pounds (See Figure 5-4). Basket-shaped pots have collapsible bottoms so more pots can be stacked on deck. Pots are set and retrieved using line haulers, hydraulic blocks and overhead hoists. Pots are baited with squid, hake, or herring.

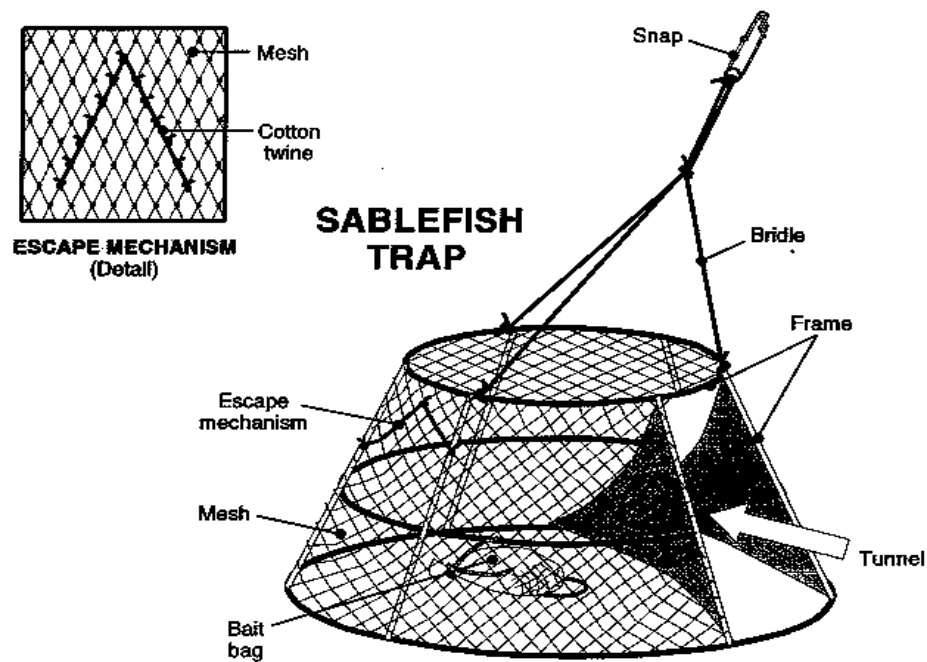


Figure 5-4: Sablefish Trap

Operations of a fixed gear vessel

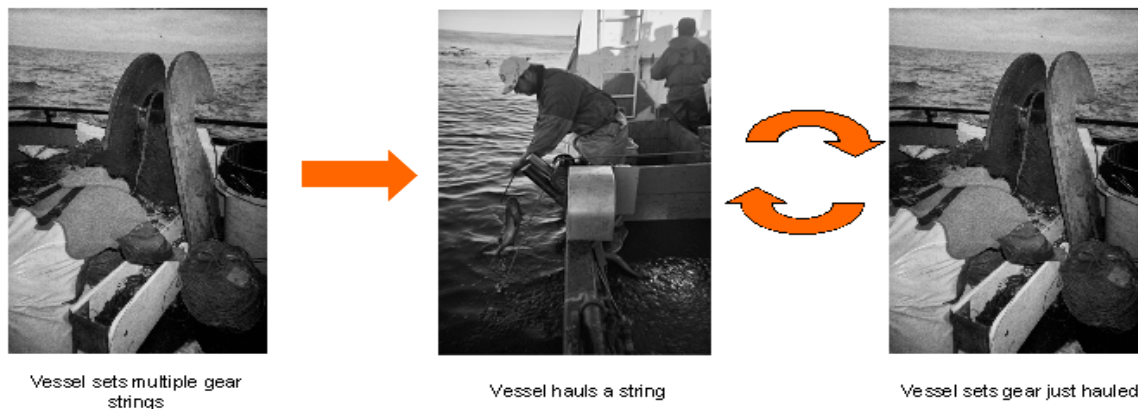


Figure 5-5: Operations of a Fixed Gear Vessel

Safety Concerns on Fixed Gear Vessels

There are several safety concerns on fixed gear vessels of which observers should be especially aware. Remember: Safety First!!

It may be necessary to sample near the roller station or the block where moving hooks or pots pose a serious threat. It is not uncommon for crew members to be seriously injured by incoming and outgoing hooks or pots.

While aboard pot vessels, observers should be conscious of their surroundings at all times. Be aware of coils of line attaching the buoys to the pot. These are deployed as the pot is launched and have been known to wrap around ankles and drag crew overboard.

Decks are often awash with water, fish entrails, and whole fish, making them very slippery. In order to reduce the risk of injury, always be conscious of dangers in the immediate area.

IV. Data Collection on Fixed Gear Vessels

There are six fisheries that may use conventional longline and pot strings.

Sablefish Endorsed (limited entry)*
Non-Sablefish Endorsed (limited entry)*
OR Nearshore (open access)
OR Rockfish (open access)
CA OA Fixed Gear (open access)
CA Nearshore (open access)

*Most commonly use conventional longline and pot strings. Other fisheries often use gear discussed in Chapter 6, “Fixed Gear Sampling on Small Boats”.

Managers have the same data needs for fixed gear vessels as they do for trawl. The data flow for sampling fixed gear vessels is:

1. Defining a Set
2. Determining Amount of Gear in a Set
3. Tally Sampling
4. Recording Catch, Species Composition, and Fishing Effort Information

On the Steam Out

There are a few pieces of information that you should learn prior to the first set or retrieval.

1. Ask the skipper how many hooks or pots the vessel will fish with during the trip. Also ask him how many sets are typically retrieved every day.
2. Determine the normal operational pattern. This will help determine a good sampling plan. Find out if the vessel haul-sets, haul-sets, haul-sets or hauls-hauls-hauls, sets-sets-sets.



V. Defining a Set

Defining a set of conventional longline or pot gear is straightforward. A set begins at a buoy and ends at a buoy. The set includes all of the hooks or pots in between the two buoys.

Generally, conventional longline sets have thousands of hooks and span two or more miles. Pot sets range from 10 to 50 pots per string. All the hooks or pots set together in a string, **even those lost prior to retrieval**, are considered a set.

VI. Determining Amount of Gear in a Set

In order to devise an appropriate sampling frame, you must determine the amount of gear in the set. There are two types of longline gear. The first type of gear has no divisible units, rather it's one long line with hooks. An example of this type of gear is snap gear. The second type is gear that can be divided into units, called skates. Vessels fishing with skate gear can vary how many hooks are fished in each set by increasing or decreasing the number of skates. Interview your captain to determine whether or not the gear is divisible into skates. Determining the number of hooks/pots in a set is different for these two types of gear.

Pot, snap longline or other gear that is not divided into skates.

To determine the number of hooks set, you will need to count all of the hooks or pots in the set. The options for counting hooks, in order of preference, are:

1. Count hooks/pots while they are being baited.
2. Count hooks/pots while the gear is stored on the vessel.
3. Count hooks/pots during gear deployment (the setting of gear).



4. Count hooks/pots while gear is being retrieved on sampled hauls and ask skipper if any gear was lost. This can be extremely difficult, especially when you need to sample for species composition at the same time. Also, counting hooks in the evening, morning, and night can be difficult due to available light.
5. Counting hooks/pots while gear is being retrieved on unsampled hauls. If you do not believe you can obtain an accurate hook/pot count while sampling, then you can take one haul off per day to count hooks/pots. **This only works if all sets have the same number of hooks/pots.**

Gear that is divided into skates

Determining the number of hooks set can be easier with this type of gear. There are two things you must determine:

- Average number of hooks per skate
- Number of skates in a set

Average number of hooks per skate:

Vessels generally have a consistent number of hooks per skate. Always document in the Observer Logbook when average hook counts were done and why that time was chosen.

1. Count the number of hooks on a skate for at least **1/5** of the gear being used **each trip**. It is usually possible to count hooks while gear is being baited or set.
2. Sum the hook counts for all the skates counted and divide by the number of skates counted to determine average number of hooks per skate.



$$\text{Average \# Hooks per Skate} = \frac{\sum \text{Hooks Counts}}{\text{\# of Skates Counted}}$$

Number of skates in a set:

Count the number of skates in a set:

1. During deployment of gear.
2. During retrieval of gear. If skate counts are done during retrieval of gear, ask skipper if any gear was lost. It can be difficult to count the number of skates during retrieval, as skate markers are sometimes hard to distinguish.

If you cannot get an accurate count of the total number of skates set, ask the captain for an estimate. If you need to rely on the captain's estimate, a verification of skates per set must be done once each day. This can be accomplished by counting skates during one of the following times:

1. While gear is being set.
2. After a set is completed and all gear is on board vessel.
3. While gear is being retrieved.

Determining the Total Number of Hooks in a Set



$$\text{Total Hook Count} = \text{Total \# of Skates} \times \text{Average \# Hooks per Skate}$$

Vessels Where Hook Counts Are Impossible

There are a few vessels in Southern California fishing longline gear on which it is impossible for observers to verify hook counts. The following circumstances combine to make counting hooks impossible:

1. All hooks must be tallied. This situation can occur for one of two reasons:
 - Single unit longline gear is being fished.



- The skate knots marking the break between gear units are not readily discernible during gear retrieval.
2. The number of hooks per gear unit is extremely variable. This makes it impossible to use average hook counts to calculate a total hook count.
 3. Vessel is retaining live fish and discarding live fish so the observer must weigh fish quickly during the retrieval.
 4. Gear is baited at an alternate location. Many fishers pay to have their gear baited. After a trip, they give their gear to the baiters who take it to a shop and bait it. When the gear is returned, it's ready to be set.

To determine the number of hooks per skate on these vessels:

1. Ask the skipper after EACH skate/tub how many hooks were on that specific skate/tub.

AND

2. Ask the skipper after EACH haul how many hooks were hauled. This is a way to double-check that the skate counts are correct. If there is a large discrepancy between the count the skipper gave you for each skate/tub and the total count for the haul, interview the skipper further about why this discrepancy occurred.

VII. Sampling Fixed Gear

Tally sampling on fixed gear vessels is conducted as the gear is being retrieved. When tallying on a line vessel, the observer counts every individual that comes up on the line, including drop-offs. When tallying on a pot vessel, the observer counts every individual in a pot.

Determining the Amount of Gear to Sample

The most important thing to remember when tally sampling is to always tally the same number of hooks or pots for all retained and discarded species.

1. 100% of a set must be tallied on vessels that use gear that is not divided into skates or pots.
2. At minimum, **1/3** of a set must be tallied on vessels that use pots or line gear that can be divided into skates.

Randomly Selecting Gear to Tally Sample

If less than 100% of a set is going to be sampled, a random sampling frame must be designed. There are four choices for designing a random sample frame:

- Systematic Spatial (preferred)
- Random (Non-systematic) Spatial
- Systematic Temporal
- Random (Non-systematic) Temporal

Spatial Sampling

Spatial sampling is gear-based and involves randomly selecting sample units from the set to tally. Fixed-gear vessels routinely set over of a depth gradient or across different bottom types. This means the catch can vary significantly along a set. The best way to account for the variability caused by setting across a depth gradient or different bottom types is to use a systematic sampling frame. Examples of systematic and non-systematic spatial sampling follow:

Systematic Spatial Sampling with Random Start (preferred)

Instructions - **Example**

1. Define population to be sampled - **A longline set of 100 skates of gear needs to be sampled.**
2. Define your sample frame – **Spatial systematic based on skates of gear.**
3. Define your sample units – **Blocks of 5 skates of gear** (# of gear segments in a sample unit may vary from haul to haul).
4. Number all the sample units in your sampling frame – **Sample units numbered as 1-20 (100 skates of gear in 5 skate increments: (1-5), (6-10), (11-15)...(96-100))**
5. Determine how many of the sample units you want in your sample (minimum of 1/3 of set). **Decide you want to sample $\frac{1}{2}$ of the string, so need to tally 10 sample units.**
6. Divide the total number of sample units by the number of units you want in your sample. This gives you your value for “n”. **$n = 20/10 = 2$**
7. Randomly select a number between 1 and n. This will be the first sample unit in your sample. **Use random number table to select a number between 1 and 2. Randomly select 2.**
8. Sample every n^{th} unit thereafter. **In this example the ‘sample units’ tallied would be 2, (2+2).... (18+2), so the skates sampled would be (6-10), (16-20),(96-100).**

Random Spatial Sampling (Non-systematic)

Instructions - Example

1. Define population to be sampled - **A longline set of 30 skates of gear needs to be sampled.**
2. Define your sample frame – **Spatial, based on skates of gear.**

3. Define your sample units – **Blocks of 3 skates of gear** (# of gear segments in a sample unit may vary from haul to haul).
4. Number all the sample units in your sampling frame – **Sample units numbered as 1-10 (30 skates of gear in 3 skate increments; (1-3), (3-6), (7-9),.....(28-30))**
5. Determine how many of the sample units you want in your sample (minimum of 1/3 of set). **Decide want to sample 4 of the 10 sample units.**
6. Pick random numbers to choose which units to sample. **In this example generate 4 random numbers between 1 and 10 (the maximum sample unit number) to determine which sample units to tally. Number 3, 7, 9 and 10 are randomly selected.**
7. Tally sample the randomly selected sample units – **Tally sample skates 7-9, 19-21, and 25-30. (Since 2 consecutive sample units, 9 and 10, were randomly selected, the last tally period includes 6 skates.)**

Temporal Sampling

Temporal sampling is time based. In order to use this type of sample system you must know the approximate length of time it will take to haul a set. Examples of both systematic and non-systematic temporal sampling follow:

Systematic Temporal Sampling with Random Start

Instructions - Example

1. Verify the length of time needed to haul the set by asking the skipper or a crew member – **Captain tells you it will take 6 hours to haul a string.**
2. Define population to be sampled – **All hooks on the string.**
3. Define your sampling frame – **Systematic temporal, based on units of time.**

4. Define your sample units – **1/2-hour blocks of time** (length of time that defines a sample unit may vary from string to string).
5. Number all the sample units in your sampling frame – **Sample units numbered as 1 – 12 (6 hours in 1/2 hour blocks; 1-30 min., 31-60 min.331-360 min.)**
6. Determine how many of the sample units you want in your sample (minimum of 1/3 of set). **Decide to sample 1/2 of the string = 6 sample units.**
7. Divide the total number of sample units by the number of units you want in your sample. This gives you your value for “n”. **$n = 12/6 = 2$**
8. Randomly select a number between 1 and n. This will be the first sample unit in your sample. **Use random number table to select a number between 1 and 2. Randomly select 1.**
9. Tally sample the first gear segment that begins in the randomly selected time period and continue tally sampling until the time period has ended **and** you have reached the end of a skate. **Begin tally sampling when crew starts hauling the set and sample until 30 minutes have passed and you come to the end of a skate.**

****Always start the sample at the beginning of a gear segment.** (For longline gear, begin at a skate knot!) Never start sampling in the middle of a gear segment regardless of the timing. If the crew is in the middle of hauling a gear segment when a sampling time begins, wait until the end of that segment to start sampling and sample for the entire time period. **If the vessel is in the middle of a gear segment when the time period ends, continue to tally sample until the entire seg-**

ment is on board, even if it means sampling for extra time!**

10. Note how many skates were tally sampled in each tally period so that you can calculate the total number hooks sampled for the set. **(This number will vary depending on length of skates and the speed at which gear is hauled.)**
11. Sample every n^{th} unit thereafter. **In this example the 'sample units' tallied would be 1, (1+2).... (9+2), so the time segments sampled would be minutes (1-30), (61-90),...(301-330).**

Random Temporal Sampling (Non-systematic)

1. Verify the length of time needed to haul the set by asking the skipper or a crew member – **Captain tells you it will take 4 hours to haul a string.**
2. Define population to be sampled - **All hooks on the string.**
3. Define your sample frame – **Non-Systematic Temporal, based on units of time.**
4. Define your sample units – **20-minute blocks of time** (length of time that defines a sample unit may vary from string to string).
5. Number all the sample units in your sampling frame – **Sample units numbered as 1-12 (4 hours in 20-minute blocks; (1-20 min.), (21-40 min.)(221-240 min))**
6. Determine how many of the sample units you want in your sample (minimum of 1/3 of set). **Decide want to sample 5 of the 12 sample units.**
7. Pick random numbers to choose which units to sample. **In this example generate 5 random numbers between 1 and 12 (the maximum sample unit**

number) to determine which sample units to tally. The numbers 3, 6, 8, 10 and 11 are randomly selected.

8. Tally sample the first gear segment that begins in the randomly selected time period and continue tally sampling until the time period has ended **and** you have reached the end of a skate. **Begin tally sampling at the start of the first skate that begins after the crew has been hauling the set for 40 minutes, and sample until an additional 20 minutes have passed and you come to the end of a skate.**



Tip* Start each tally sample with the first gear segment that **begins** in the randomly selected time period. **Always start the sample at the beginning of a gear segment.** (For longline gear, begin at a skate knot!) Never start sampling in the middle of a gear segment regardless of the timing. If the crew is in the middle of hauling a gear segment when a sampling time begins, wait until the end of that segment to start sampling and sample for the entire time period. **If the vessel is in the middle of a gear segment when the time period ends, continue to tally sample until the entire segment is on board, even if it means sampling for extra time!**

9. Note how many skates were tally sampled in each tally period so that you can calculate the total number hooks sampled for the set. **(This number will vary depending on length of skates and the speed at which gear is hauled.)**
10. Sample all randomly selected time periods. **In this example the time segments sampled would be minutes (41-60), (101-120), (141-160) and (181-220). (Since 2 consecutive sample units, 10 and 11, were selected, the last tally period is 40 minutes long.)**

Observer should have their random sample frame designed prior to the start of haul back.



Where to Tally Sample

The tally station is where the observer stands to count organisms as the groundline or pot is being retrieved. The tally station should be no more than six meters from where the fish are landed and the observer should have a clear line of sight to the fish as they come aboard. From the tally station, observers must be able to clearly identify fish as they come aboard and identify drop-offs.

Equipment Needed

A Fixed Gear Catch form, three to six thumb counters, and a clipboard will be needed. Prior observers have devised many innovative techniques to make using multiple thumb counters easier. The most common is to use duct tape to attach multiple thumb counters to a clipboard. Other observers have used duct tape and line to create thumb counter belts that fit around the waist. Observers should be creative, experiment, and find out what works best

Tallying

Relatively speaking, tally sampling is very straightforward. When tally sampling, observers count all individuals by species as they are brought out of the water.



Tip* Always tally the same number of gear units for retained and discarded species. (For example, **do not** tally 1/3 of a set for retained species and the whole set for discard species.)

The following situations occur and must be handled appropriately:

- **Species similar in appearance** - Some species, such as Shortraker and Rougheye rockfish, are similar in

Drop-off - Fish that fall off the line as they leave the water line. These individuals do not make it aboard the vessel.

Predation - Fish that have been damaged by whales, sand fleas, hagfish, lingcod, or other creature.

appearance and cannot be distinguished unless they are in hand. For these species, tally as a mixed group such as Rougheye/Shortraker or Shortspine/Longspine

- **Drop-offs and Predation** - If any individual that *would have been retained* drops off the line or is preyed upon, it should be tallied as such.
- **Small individuals of retained species** - Often, vessels will discard individuals of the target species if they are below a certain size. These should be tallied independently of other discarded individuals of that species, including discards resulting from drop-offs or predation.
- **Pacific halibut** - If actual weights cannot be obtained, visually or actually length all Pacific halibut in tally sample and use the PHLB Length/Weight Conversion chart to determine weights (See Appendix K: Pacific halibut Length/Weight Table on page 29.)

Weights on Fixed Gear Vessels

Extrapolation - To determine species weight, an average weight per fish must be multiplied by the total number of fish in tally sample because all individuals of species not weighed.

There are four ways to determine weight of species on fixed gear vessels. They are, in order of preference:

1. **Extrapolated** or actual weight from individuals in same set
2. Extrapolated weight from individuals in “like” sets
3. Visually estimated weight
4. Fish ticket weight (retained individuals ONLY)

The exception is Pacific halibut for which the PHLB Length/Weight Conversion chart can be used.

Extrapolated or actual weights from individuals in same set

Observers collect all or a random subsample of species when using this method.



Tip* Collect, at minimum, 15 individuals from non-target species for average weight calculations. Count and weigh at least 50 individuals from target species.

There are two options for when to collect individuals:

- **During tally period** – The preferred method for **discarded species** and **non-target retained species** is to collect individuals during the tally period. When individuals are collected during the tally period, it ensures that all species needed for average weights are present. Collect and weigh, at minimum, 15 individuals of each non-targeted species and 50 individuals of the targeted species.
- **During non-tally period** – **Target** species individuals are often collected during the non-tally period due to space limitations and/or time constraints. *Beware:* If non-target individuals are collected only during the non-tally period, all species that occurred in the tally sample may not be present.



Tip* Fish carcasses or skeletons should not be weighed when determining tally sample weights. The sample weight should be an estimate of whole fish weight based on the number of fish that were caught.

Random Sampling

There are two methods to used to randomly collect individuals for average weight determinations. These two

methods, random spatial and systematic sampling, are detailed below.

Random Spatial Sampling

Spatial sampling is a good method to use for species caught in **small** quantities.

1. Select gear segments to use for collecting individuals using one of the following two methods:
 - Select all non-tally-sampled gear segments.
 - Randomly select one or more gear segment from the entire set.
2. Collect all individuals.
3. Weigh the collected individuals for average weight determinations.

Example of Random Spatial Sampling

1. The Blue Dragon sets 20 pots.
2. The observer on the Blue Dragon randomly selects 13 of the 20 pots to tally sample by pulling numbers out of a hat.
3. The observer uses the remaining 7 pots to collect and weigh individuals for average weight determinations.



Systematic Sampling

Systematic sampling is a good method to use for species caught in **large** quantities and in **live fish** fisheries.

1. Select gear segments to use for collecting individuals using one of the following methods:
 - Select all non-tally-sampled gear segments.
 - Randomly select one or more gear segments from the entire set.
2. Systematically collect a portion of the total number of individuals.

- Estimate the total number of individuals that will be caught in the sampling frame.
 - Divide the estimated total individuals by the number of fish needed (at least 15) to determine the collection frequency (n).
 - Collect every n^{th} individual beginning with a randomly chosen starting point.
3. Weigh the collected individuals for average weight determinations.

Example of Systematic Sampling

1. The Miss Fish sets a longline with 10 skates.
2. The observer randomly selects skate 2 for obtaining average weight by selecting a number from a random number table.
3. The observer estimates that 100 sablefish will be caught in skate 2.
4. The observer wants to collect 20 sablefish to use for an average weight determination.
5. The observer determines the frequency to collect sablefish by dividing 100 by 20 to get a collection frequency of 5.
6. The observer randomly chooses a number between 1 and 5 from a random number table and gets the number 4. Starting at the beginning of skate 2, the observer collects the 4th fish and then every 5th sablefish after that (9, 14, 19, etc.) until the end of skate 2 is reached.
7. The observer weighs the sablefish and divides the weight by the actual number of fish collected to calculate the average sablefish weight.

“LIKE” Sets - Like sets are

1. Close in proximity
2. In same depth range
3. Similiar in soak time

Extrapolated Weight from “Like” Sets

There may be one or more species that were impossible to collect individuals to use for average weights. This usually happens if only a few individuals of a given species is caught. If this occurs, use average weights of the same species from a similiar haul.

Visually Estimated Weights

Occasionally, observers will need to visually estimate the weight of a species. Visually estimated weights are primarily used for very large individuals (skates, sharks) and species that occur rarely and were not collected for weights.

For example: Large skates will usually break the gangions when they leave the water. This means the observer will not be able to get a weight for large skates and using an average weight from smaller skates would be biased. Therefore, taking a visual estimate of the weight is the best option.

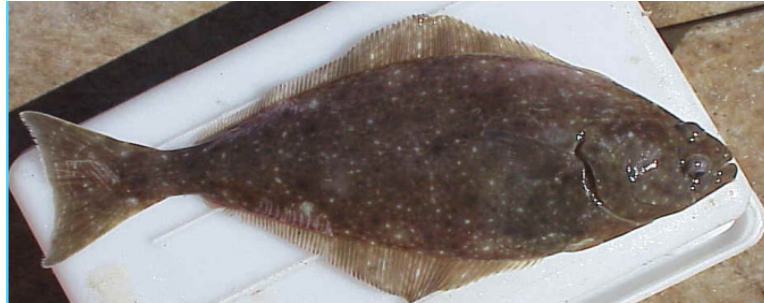
Fish Ticket Weights (Retained Fish Only)

Because fishers participating in the live fish market are extremely concerned about the condition of their fish, weighing retained individuals may not be possible. If it is not possible to collect and weigh a sample of retained fish for average weights and **100% of the gear has been tally sampled**, delivery weights (fish tickets) can be used to calculate the average weights of retained species on these vessels.

Pacific Halibut

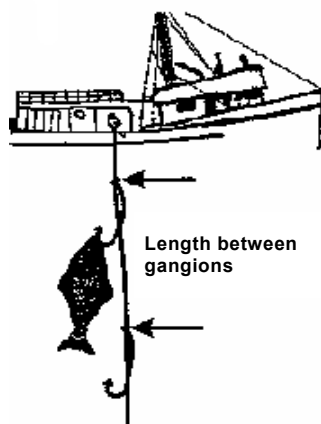
Pacific halibut are often too large to obtain an accurate weight with the scales provided, and large individuals may not be brought on board the vessel at all. If the fish are small enough to weigh, it is preferred that individuals be

collected for an average weight sample and applied to the tallied number. For situations where this is not possible, the

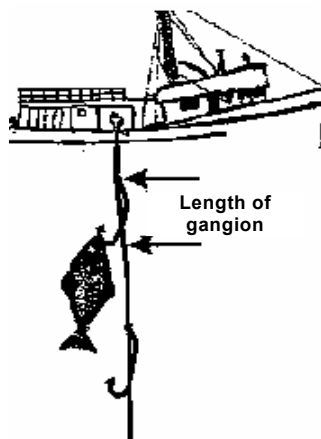


IPHC has developed a length-to-weight table that lists approximate weights of Pacific halibut based on the length in centimeters (Appendix K: Pacific halibut Length/Weight Table on page 29). It is acceptable to estimate the weight of Pacific halibut in tally samples using this table. If actual lengths cannot be obtained, it is permissible to use visually estimated lengths.

The following suggestions will help with estimating the length of Pacific halibut:



Estimating halibut length
using distance between
gangions.



Estimating halibut length
using length of gangion.

- Measure the distance from the roller to weld marks on the side of the vessel or the waterline, if weather permits.
- Measure the distance between the gangions on the groundline and measure the length of the gangions themselves. On most longline vessels, the distance between the gangions and the length of the gangions are consistent. During normal operations, the observer will be able to see the fish being pulled by the groundline and gangion. Estimate the length of the Pacific halibut in reference to the length of groundline between the gangions or the length of the gangion itself.
- Use the length of the gaff or the pole gaff to compare to the lengths of the Pacific halibut.
- Pre-measure the length of the longline trough. Some Pacific halibut will be brought on board either to be retained or by accident. Having several marked

measurements in the trough will allow the observer to quickly estimate the length of any landed Pacific halibut.

- After sampling a set, use the Length-to-Weight Table in Appendix K: Pacific halibut Length/Weight Table on page 29 to determine proper weights. Multiply the number of Pacific halibut for each length by the weight from the table. Sum the weights for all sizes to obtain the total weight of Pacific halibut in the sample.

Tally Sampling Review

1. Count each individual by species that comes up on the line or in the pot, including drop-offs.
2. Use hand counters or hash marks to count species. Document tally sample on the back of the Fixed Gear Catch Form.
3. Collect and weigh individuals of each species in tally sample and record weights on back of Fixed Gear Catch Form.

VIII. Documenting Tally Samples

The tally sample is normally documented on the back of the Fixed Gear Catch Form, along with the weights of individuals of each species weighed. Once sampling for the haul is complete, the Catch Form and Species Composition Forms can be completed.

Catch Categories on Fixed Gear Vessels

As noted earlier, the same 2 rules apply for catch categories on fixed gear vessels as trawl vessels.

- Retained and discarded individuals are always in separate catch categories.
- All individuals with the same weight method and sample method are recorded in the same catch category.

CHAPTER 5

Fixed Gear Sampling

Gear Units Sampled	15	Average Soak Time/Gear Unit:	N/A	# hooks/gear unit:	136
Retained			Discarded		
7 @ 57.82 lbs					
8 @ 71.96 lbs					
10 @ 86.91 lbs					
6 @ 53.84 lbs					
8 @ 61.43 lbs					
8 @ 72.34 lbs					
7 @ 52.16 lbs					
	562	Sable		(Drop-off)	
		Arrowtooth			15 @ 77.0lbs (Market)
		Starfish			11 @ 10.23 lbs
14 @ 55.0		Red-Banded		(Drop-off)	
		Spiny Dog		51	15 @ 60.74 lb (Market)
2 @ 5.5lbs		Shortspine		(Drop-off)	
		Skate (Visual)	40 30 20 60 20 50 40 45 30 40 20 30		(Market)
		P. halibut (visual length)	30 40 50 60 80		

Figure 5-6: Tally Sample Example

There are only four weight methods that can be used for Catch Categories on Fixed Gear Vessels. They are:

Weight method 4 – Visual Estimate

Weight method 6 - Other

Weight method 9 – Pacific Halibut Length/Weight

Weight method 13 – Tally Sample

Remember, no matter which weight method is used, actual counts must be obtained for all individuals in the sample.

Weight Method 4 – Visual Estimate

This weight method is used for species that have a count but ONLY a visual weight. When a visual estimate is used, there is no species composition sample associated with the catch category. Therefore, the catch category should be assigned the most descriptive name possible. (Example: Visually estimates skates should be recorded under the code SKAT.) For a list of PacFin catch category codes, See Appendix F: Catch Categories and Target Strategies on page 22

Weight Method 6 – Other

This weight method should never be intentionally used. It creates confusion for end users and debriefers because it does not indicate how the weight was actually derived. If this method is used, document what happened in the Observer Logbook and on the paperwork.

Weight Method 9 – Pacific Halibut Length/Weight

This weight method is ONLY used for Pacific halibut. Actual lengths or visually estimated lengths can be used.

Weight Method 13 – Tally Sample

This weight method is used for species that are counted AND an actual, extrapolated, or fish ticket weight has been obtained.

Fixed Gear Catch Form Instructions

The Fixed Gear Catch Form (See Figure 5-7) is used to document sample weight and other catch information. A Catch Form should be completed for all hauls.



Tip* The “weight” column is filled out differently on the Fixed Gear Catch Form than on the Trawl/Prawn Catch Form. For Fixed Gear, the weights recorded are sample weights; for Trawl/Prawn, the weights represent total weight estimates for the catch category.

- **Haul Number** – Record the number of the haul.
- **Date** – Record the date as MM/DD/YY.
- **Trip Number** – Record the trip number generated by the database system.
- **USCG #**– Record the USCG vessel number (if they have one.) If the vessel does not have a USCG number, leave this field blank.
- **Catch #** - Number the catch categories consecutively, starting from 1 for each haul. The numbers on the paper Catch Form must match the numbers assigned by the database when data is entered.
- **R or D** – Record whether the catch category is from **R** – Retained or **D** – Discarded catch.
- **Catch Category** – Record, in capital letters, the catch category sampled in the 3 or 4-letter PacFin code. For a list of PacFin catch category codes, see Appendix F: Catch Categories and Target Strategies on page 22.

- **Sample Weight** – Record the weight of the tally sample for the catch category in pounds.



Tip* If there is a species composition sample for the catch category, the Sample Weight should be the same as the Keypunch Weight on the Species Composition Form!! (If not, there is a problem).

- **Numbers of Fish** – You **MUST** record the total number of fish in the catch category if Weight Method 4 – Visual Estimate or Weight Method 9 – Length/Weight conversion is used. Do not record the number of fish for weight method 13 – Tally Sample.
- **Hooks/Pots Sampled** – Record the number of hooks or pots that were tally sampled.
- **Weight Method** – Document the weight method used to estimate the catch category.
 - 4 - Visual Estimate.
 - 6 - Other
 - 9 – Length/Weight Conversion (Pacific halibut only)
 - 13 – Tally sample.
- **Catch Purity** – If catch category was *sampled* for species composition, record a M - Mixed if more than one species was within sample. Record P - Pure if there was only one species in species composition sample.

If the catch category was *not sampled*, record as P – Pure if the catch category is composed of 95% or greater a single species or as M – Mixed if the catch category is composed of less than 95% a single species.

- **Discard Reason** – Record the skipper/crew's reason for discard for unsampled (no species composition sample taken) discarded catch categories only.
 - 11 - Incidental/Accidental

- 12 - Drop-off
- 13 - Market
- 14 - Other
- 15 - Predation
- 16 - Regulation
- 17 - Safety



Tip* Look only at the primary reason for discard. For instance, if the vessel is not retaining Starry Flounder and one drops-off, do not record the reason for discard as drop-off. Even if it had made it on the vessel, the fish would not have been retained. This also applies to preyed upon that drop-off. If a fish that would have been retained drops off because it's been preyed upon, the reason for discard should be predation (even if the fish made it aboard it would not have been retained due to predation).

- **Vessel Estimate** – This column is blank on fixed gear vessels.
- **Comments** – Document anything important about each catch category.
- **Keypunch Checks** – These are required field for Sample Weight, Numbers of Fish, and Numbers of Hooks/Pots columns. Sum up the entries in each column and place the total in the corresponding keypunch box at the bottom of the form.



Sample Methods for Species Composition

There are three sample methods for species composition sampling on fixed gear vessels..



Tip* Only catch categories with a weight method of 13 - Tally Sample will have species composition samples.

Sample Method 4 – Fixed Gear Sample

Used for species whose weight is determined by

1. Extrapolated or actual weight from individuals in the same set.
2. Extrapolated weight from individuals in a “like” set.

Average Weight Calculations

For species that all the individuals in the tally sample were not weighed, an average weight calculation is used to calculate the sample weight of the species. To determine sample weight:

1. Randomly collect individuals to be weighed
2. Weigh and count individuals.
3. Divide the weight of individuals weighed by the number of individuals weighed and then multiply by the total number of individuals of that species in tally sample.



$$\text{Total Sample Wt} = \frac{\text{Wt of Subsample} \times \text{Total \# in Tally Sample}}{\text{\# in subsample}}$$

Sample Method 5 - Fixed Gear Fish Ticket Verified

Used for species whose weight is determined by using the fish ticket (landing receipt) weight AND when the observer has “verified” that the weight on the fish ticket represents

the number of individuals per species in the retained tally sample. **For a fish ticket weight to be considered verified, the observer must observe the landing and be 100% confident that all fish in their tally sample are weighed at the landing.**

Sample Method 6 - Fixed Gear Fish Ticket Unverified

Used for species whose weight is determined by using the fish ticket (landing receipt) weight AND when the observer was not able to see the landing or is not confident all individuals in the tally sample were included in the fish ticket weight.

Using Delivery Weights for Average Weights of Talled Individuals

1. Observe the weighing of the fish by species upon landing, if possible. If not, ask the skipper for a copy or look at the weights on the fish ticket.
2. Calculate average weight of species by:



$$\text{Average Species Wt} = \frac{\text{Landing Weight of Species (lbs)}}{\text{\# of Individuals of Species Caught During ENTIRE Trip}}$$

3. For each haul, calculate the weight of retained species.

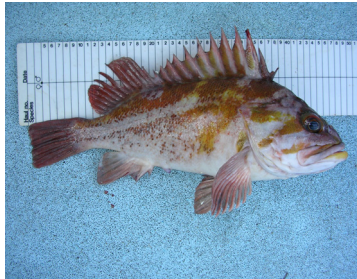


$$\text{Species Wt By Haul} = \text{Average Species Wt} \times \text{\# of Individuals Caught in Haul}$$

Species Composition Form Instructions

The species composition information is recorded on the Species Composition Form (See Figure 5-8).

- **Haul Number** – Record the number of the haul that the sample came from.
- **Date** – Record the date as MM/DD/YY.



- **Trip Number** – Record the trip number generated by the database system.
- **USCG #** – Record the USCG vessel number (if they have one.) If the vessel does not have a USCG number, leave entry field blank.
- **Catch #** - Record the number that corresponds to the catch category on the Catch Form.
- **Sample Method** – Record the method used to sample the catch category.
 - 4 – Fixed Gear
 - 5 - Fixed Gear Fish Ticket Verified
 - 6 - Fixed Gear Fish Ticket Unverified
- **# Of Baskets** – This field is blank on fixed gear vessels. (Species Composition form v.4 does not have this column)
- **Catch Category** – Record, in capital letters, the catch category in the 3 or 4-letter PacFin code. For a list of PacFin catch category codes, see Appendix F: Catch Categories and Target Strategies on page 22.
- **KP Weight and KP Number** – Sum up the total weight of all species in the catch category sample and place the total weight in the Keypunch (KP) Weight box. Sum up the total number of all individuals in the catch category sample and place the total number in the Keypunch (KP) Number box.



Tip* Check to be sure the KP Weight on the Species Composition form is the same as the Catch Category Sample Weight on the Catch Form!! (If not, there is a problem).

- **R or D** – Record whether the catch category sampled was **R** – Retained or **D** – Discarded.

- **Species** – Record the common name of the species in the sample. This column must be filled in with the species name. Do not simply enter the species code! The common name listed on the paperwork must match the common name used in the database. See Appendix A: Fish Species List and Codes on page 2, Appendix B: Invertebrate Species List and Codes on page 14, Appendix C: Marine Mammal and Sea Turtle Species List and Codes on page 17, Appendix D: Seabird Species List and Codes on page 19 for a list of species.
- **Species Code** – Record the species code number of the corresponding species. This can be done prior to entering data and not on deck. See Appendix A: Fish Species List and Codes on page 2, Appendix B: Invertebrate Species List and Codes on page 14, Appendix C: Marine Mammal and Sea Turtle Species List and Codes on page 17, Appendix D: Seabird Species List and Codes on page 19 for a list of species.
- **Sample Weight** – Record the total weight of the species in the sample (**can be extrapolated**).
- **Fish Number** – Record the number of fish of each species in the sample (**can NOT be extrapolated**).
- **Reason for Discard** – Record the skipper's/crew's reason of discard for each discarded species.
 - 11 - Incidental/Accidental
 - 12 - Drop-off
 - 13 - Market
 - 14 - Other
 - 15 - Predation
 - 16 - Regulation
 - 17 - Safety



Tip* Look only at the primary reason for discard. For instance, if the vessel is not retaining Starry Flounder and one drops-off, do not record the reason for discard as drop-off. Even if it had made it on the vessel, the fish would not have been retained. This also applies to fish preyed upon that also drop-off. If a fish that would have been retained drops off because it's been preyed upon, the reason for discard should be predation (even if the fish made it aboard it would not have been retained due to predation).

- **Basket Weight and Number** – Use this column on deck to document numbers and weights. Be sure to fill the “Sample Weight” column in with the total weight of the species in the sample only!

CHAPTER 5

Fixed Gear Sampling

[illegible]

Trawl Sample Methods : 1-Whole haul species 2-Single basket 3-Multiple basket Fixed Gear Sample Methods 4-FG Sample 5-FG(Verified Fish Ticket) 6-FG(Unverified Fish Ticket) Species Composition Form v.4
Reasons for Discard: 11-Incidental/Accidental 12-Drop-off 13-Market 14-Other 15-Predation 16-Regulation 17- Safety January 2006

Figure 5-8: Species Composition Form

IX. Determining OTC on Fixed Gear Vessels

There are only two ways to calculate OTC on fixed gear vessels.

Weight Method 8 - Extrapolation

This method is used when less than 100% of the gear is tally sampled.



$$\text{OTC} = \frac{\sum \text{All Catch category weights on Catch Form} \times \text{Total \# of Hooks in Set}}{\text{Number of hooks sampled}}$$

Note: When gear has been lost, weight method 8 - extrapolation must be used to calculate OTC in order to account for the unsampled (lost) gear.

Weight Method 11 - Retained + Discarded

This method is used when 100% of the gear is tally sampled.



$$\text{OTC} = \sum \text{All Catch Categories on Catch Form}$$

X. Recording Fishing Effort Information and Total Catch Estimates

Fishing effort information must be recorded for every set a vessel makes while the observer is on board. The fishing effort information is recorded on the Trip Form, which is separated into two sections:

Trip Form Instructions

A Trip Form must be completed for all observed trips. (See Figure 5-9)

EFP -Permits that allow fishing activities that would otherwise be prohibited. The permits are usually written by the states and must pass a vote by the PFMFC.

Question: What's a trip?

Answer: A trip is a fishing activity that typically results in the completion of a fish ticket (landing receipt). The exception is when the vessel fished but did not retain any species.

- **Fishery Type** – Circle the fishery type the vessel participated in. (**LE** = Limited Entry, **OA** = Open Access, or **EFP** = Exempted/Experimental Fishing Permit).
- **Page #** – All Trip Forms are numbered together by trip. (If there are 5 Trip forms on one trip, number them 1 – 5.)
- **Trip Number** – This is an automatically generated number by the database. Complete this field once the trip has been started in the database.



Tip* Some observers find it easier to start a trip prior to leaving port. Doing this allows the observer to fill in the Trip Number while at-sea rather than when the observer returns to port.

- **Observer Name** – Record your first and last name.
- **Year** – Record the year as YYYY.
- **USCG #** – Record the USCG vessel number. Request this six or seven digit number from the vessel skipper or a coordinator. **If the vessel does not have a USCG number, leave entry field blank and fill in the State Registration Number field.**
- **State Registration Number** – Use this field **only** if the vessel does not have a USCG number. The state registration number will begin with a **CF** in California, **OR** in Oregon, and **WN** in Washington.
- **Vessel Name** – Record the full name of the vessel.

- **Partial Trips** – Check the box if the trip included more days than were observed. (Fish ticket includes unobserved catch.)



Tip* Partial trips usually occur when a vessel fishes multiple day trips in a row.



- **Total # of Fishing Days (Known)** – Document the total number of days the vessel fished before landing. **This field is only completed when the trip is a partial trip.**



Tip* Do not guess or make an assumption to complete this field. If you do not know how many days the trip lasted, leave column blank.

- **Fishery** - Record the name of the fishery the vessel was selected for.
 - Limited Entry Trawl
 - Limited Entry Sablefish
 - Limited Entry Zero Tier
 - CA Halibut
 - CA Nearshore
 - CA Open Access Fixed Gear
 - OR Blue/Black Rockfish Nearshore
 - OR Blue/Black Rockfish
- **Vessel Logbook Number (from “WOC Groundfish Logbook” Only)** - This column is left blank for fixed gear vessels. However, vessel logbooks may be used. Record the name of the logbook and the page number used to record the information was recorded on in the Trip Notes.
- **Skipper’s Name** – Record the first and last name of the skipper.

- **Observer Logbook #** - Record the number on the front page of the Observer Logbook used to document information about the trip.
- **Departure Date/Time** – Document the date and time the vessel left port.
- **Departure Port** – Document the port the vessel departs from.
- **Landing Date/Time** – Document the date and time the vessel returns to port.
- **Landing Port** – Document the port the vessel returns to.
- **Fish Ticket Number** – Obtain the numbers of all landing receipts (fish tickets) from the vessel skipper, the port biologist, or the state liaison. **This is a required field for all fisheries and trips!**
 - CA fish tickets begin with a letter followed by six digits
 - OR fish tickets are seven digits
 - WA fish tickets begin with a letter followed by six digits
- **WOC** - The state agency code will be **C** - for California deliveries, **O** – for Oregon deliveries, or **W** – for Washington deliveries.
- **Date** – Document the date in MM/DD/YY of fish ticket issuance.
- **Haul/Set Number** – Number hauls consecutively, starting with 1 for each trip.

Question: Why are observers required to record Fish Ticket Numbers?

Answer: When observer data is analyzed, the total landed weight from the Fish Ticket is used to estimate the amount of discard by species per landed weight of target(s).



Tip* Hauls must be numbered in the order retrieved!! If hauls are numbered in the order they were set all Catch, Species Composition, and Trip Information will need to be renumbered at debriefing.

- **Observer Total Catch Estimate (OTC)** – Record the total catch estimate to two decimal places. Observer Total Catch estimate is recorded in pounds.
- **Volume of Codend or Trawl Alley/Bin** – This column is left blank on fixed gear vessels.
- **Density** – This column is left blank on fixed gear vessels.
- **Weight Method** – Enter the number for the weight method used to obtain the observer total catch estimate. The weight methods that may be used for fixed gear OTC's are:

8 - Extrapolation

11 - Retained + Discarded



- **Total Hooks/Pots** – Record the total number of hooks or pots in the set. This number should include lost gear.
- **Gear Performance** – Record one of the following codes to document gear performance.
 - 1 - No problem
 - 2 - Pot was in the haul
 - 3 - Net hung up
 - 4 - Net ripped
 - 5 - Trawl net or codend lost, pot(s) lost, other gear lost
 - 7 – Other problem – Document other gear related problem in the comments section
- **Beaufort Scale** – This is not a required field at this time. Do not fill in unless otherwise directed by program staff.
- **Comments** – Document any information that is important about the haul.
- **OTC Keypunch Check** – Sum the OTC's for an entire trip and record total weight of trip in the OTC keypunch check box (If there is more than one Trip form, sum

- Trp Form v.5
January 2006

5-47

Trip Form – Haul Locations



Tip* Observers are often required to record haul location information on their own.

(See Figure 5-11)

- **Trip Notes** – Document any information pertinent to understanding the trip.
- **Start and End Date** – Document the date the haul was set and the date the haul was retrieved as MM/DD.
- **Start and End Time** – Document the Pacific Standard Time (PST) when the first hooks were put into the water for the start time. **Document the time when the last hook is brought on board during retrieval for the end time.**
- **Start and End Latitude** – Document the latitude (in degrees, minutes, 1/100th of a minute) that the haul was set and retrieved.

Loran: If the vessel is using Loran C, document the Loran coordinates. Send these to a coordinator in an Excel spreadsheet and they will return the latitude and longitude positions.



Tip* When an observer boards a vessel that has a GPS, check to be sure the it's recording in degrees, minutes, 1/100th of a minute. If it's not, ask the captain to change the view to 1/100th of a minute instead of seconds. (See Figure 5-10)

- **Start and End Longitude** – Document the longitude (in degrees, minutes, 1/100th of a minute) that the haul was set and retrieved.



Figure 5-10: GPS Showing Latitude and Longitude

Fathoms: 1 Fathom = 6 Feet

- **Depth** – Document the fishing depth in **fathoms**.
- **Gear Type** – Enter a code for the gear type based on the configuration of the gear, rather than how it is being fished. (Example: If the vessel is using a fishing pole while under way (trolling), the gear type would be recorded as 8 - Pole.)
 - 6 - Longline or Set net
 - 7 - Vertical Hook and Line
 - 8 - Pole
 - 9 - Other Hook and Line Gear
 - 10 - Fish Pot
 - 15 - All Troll Gear
 - 16 - All Other Miscellaneous Gear

****If the fishing vessel is not using one of the above gear types, this is most likely the wrong section of the manual.**
- **Target Strategy** - Enter the vessel's target strategy. Refer to Appendix F: Catch Categories and Target Strategies on page 22 for a list of target strategies.

CHAPTER 5
Fixed Gear Sampling

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TRIP FORM - HAUL LOCATIONS

Haul/ Set #		Date		Time	Latitude		Longitude		Depth of Catch (fathoms)	Gear Type	Target Strategy
		Month	Day		Degrees	Minutes	Degrees	Minutes			
	Start					.		.			
	End					.		.			
	Start					.		.			
	End					.		.			
	Start					.		.			
	End					.		.			
	Start					.		.			
	End					.		.			
	Start					.		.			
	End					.		.			
	Start					.		.			
	End					.		.			
	Start					.		.			
	End					.		.			
	Start					.		.			
	End					.		.			
	Start					.		.			
	End					.		.			
	Start					.		.			
	End					.		.			
	Start					.		.			
	End					.		.			

Figure 5-11: Trip Form-Haul Location

XI. Unsampled Sets

Every set retrieved during a trip **MUST** have an OTC, even if it has not been sampled. For sets that are not sampled, employ a “sum of like sets” to determine OTC. Using a “sum of like sets” provides an estimation of catch based on sets from similar areas, depths, and times.

Never use the vessel’s estimate for OTC on a fixed gear vessel.

When estimating the OTC for an unsampled set, use more than one “like set” for the calculation. “Like sets” should be close in proximity, at the same depth, and of similar soak time as the unsampled set. In most circumstances, observers will be able to use the sets just before and after the unsampled set. The lengths of the set or the number of hooks in the comparison sets do not need to be similar for the calculation of “like sets.”



$$\text{OTC of Unsampled Set} = \frac{\text{Total Wt of "Like" Set A} + \text{Total Wt of "Like" Set B} \times \# \text{ Hooks Unsampled Set}}{\text{Total \# of Hooks in Set A} + \text{Total \# of Hooks in Set B}}$$

The weight method for the OTC of an unsampled set should be recorded as 6 - Other on the Trip Form and it should be noted in the Haul Comments that a “sum of like sets” was used.

XII. Lost Sets

Occasionally, vessels lose an entire set. If this happens record the following on the Trip Form:

- Record the fishing effort information the same as with any other set except use the Landing date and time from the Trip Form as the haul end time.
- Document gear performance code 5 - Gear lost on the Trip Form.

- Leave the OTC column blank.



XIII. Trip Discard

On rare occasions, a vessel will discard fish from the hold. This happens if market conditions change during a trip or if they are catching larger fish that are worth more money. Record discard that cannot be attributed to a specific haul on the Trip Discard Form (See Figure 5-12).

The Trip Discard Form is not entered into the database system. Document the information from the Trip Discard Form in the Trip Notes on the Trip Page in the database.

- **Trip Number** – Record the trip number generated by the database system.
- **USCG #**– Record the USCG vessel number (if they have one.) If the vessel does not have a USCG number, leave this field blank.
- **Date** – Document the month (MM) and day (DD) that the trip discard took place.
- **Time** – Document the time, in PST military time, that the trip discard took place.
- **Species** – Document the **common name** of the species that was discarded.
- **Weight** – Document the weight, in pounds, of species discarded.
- **# Of Fish** – Document the number of fish discarded (if known.)
- **Weight Method** - Document the weight method used to estimate the species weight.
 - 1-Actual Weight
 - 2-Bin/Trawl Alley Estimate
 - 3-Basket Volume Determination

- 4-Visual Estimate
- 5-OTC-Retained
- 6-Other
- 7-Vessel Estimate
- 8-Extrapolation
- 9 - PHLB Length/Weight

- **Discard Reason** - Record the skipper's/crew's reason of discard for each species.
 - 11 - Incidental/Accidental
 - 12 - Drop-off
 - 13 - Market
 - 14 - Other
 - 15 - Predation
 - 16 - Regulation
 - 17 - Safety
- **Comments** – Document any additional information that is important.

CHAPTER 5

Fixed Gear Sampling

Trip Discard Form

Page ____ of ____

Trip Number					
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USCG #

--	--	--	--	--	--	--

[illegible]

Trip Record Form v.2 January 2004

Figure 5-12: Trip Discard Form

XIV. Examples




















Hook an line

Haul #		FIXED GEAR CATCH FORM*										Page __1__ of __2__	
Date		Trip Number					USCG #						
0 8 1 6 0 5		1 1 2					5 0 6 4 9 7						
Catch #	R or D	Catch Category	Sample Weight	#s of Fish Req. for wt. methods 4, 6, 9	# Hooks/Pots sampled by catch category	Weight Method	Catch Purity	Discard Reason	Vessel Estimate	Comments			
1	R	ZMIS	2574.06		4200	13	M						
2	D	ZMIS	607.62		4200	13	M						
3	D	SKAT	65	2	4200	4	P	13		Longnose skate			
4	D	PHLB	385.09	15	4200	9	P	16					
Keypunch Checks			3631.77	17	16800								

*Gear Types 6, 7, 8, 9, 10, 15, 16

January 2004
Fixed Gear Catch Form v. 4

CHAPTER 5 **Fixed Gear Sampling**

Official Total Catch Calculations					
Gear Units Sampled			Average Soak Time/Gear Unit:	# hooks/gear unit:	
	Total hooks = 21 skates x 200 hks skate		200		
Retained	Tally	Discarded			
	381	Sable	small	DO	Pred
Sable					
4 @ 39.5					
3 @ 25.4					
3 @ 15.5			1 @ 2.7		
7 @ 42.2					
6 @ 35.8		SSPN	small - 1@.6	DO	
4 @ 25.8		8 @ 7.7			
6 @ 31.4		5 @ 4.5			
6 @ 41.0					
6 @ 43.4		Longnose	1 @ 23.6	1 @ 13.8	Visuals – 1 @ 35
5 @ 33.2		skate	1 @ 5.9	1 @ 20.5	1 @ 30
6 @ 43.4			1 @ 8.2	1 @ 14.2	
6 @ 44.7			1 @ 11.5	1 @ 15.7	
6 @ 40.0					
6 @ 35.6					
		Giant	1 @ 13.8		
		Wrymouth			
		Spiny			
		Dogs	3 @ 11.2	4 @ 13.6	
			5 @ 18.6	5 @ 15.5	
			3 @ 9.4		
		Redbanded		1 @ 2.9	
		Rose thorn	1 @ 1.2	1 @ .9	
		Arth			
			9 @ 49.7	8 @ 44.9	
			4 @ 19.4	8 @ 43.0	
		PTRL	1 @ 3.5		
		urchin	1 @ .3		
		Starfish	2 @ .9		
		Sandpaper	1 @ 2.3	1 @ 3.1	
		Hagfish	1 @ .9		
PHLB (discard)	60				
	70				
	80				
	90				
	100				
	110				
	120				
	130				

CHAPTER 5
Fixed Gear Sampling

Haul # 0 1 **SPECIES COMPOSITION FORM** Page 2 of 2

Date 0 8 1 6 0 5 Trip Number 1 1 2 USCG # 5 0 6 4 9 7

Catch #	Catch Category	Sample Method	KP Weight	R or D	Species	Species Code	Sample Weight	Fish #	Discard Reason	Basket Weight	#	Basket Weight	#
			KP Number										
1	ZMIS	4	2574.06 395	R	SABL	203	2558.36	381					
					SSPN	350	12.2	13					
					PTRL	112	3.50	1					
2	ZMIS	4	607.62 118	D	SABL	203	8.10	3	13				
					SABL	203	80.58	12	12				
					SABL	203	6.71	1	15				
					SSPN	350	0.6	1	13				
					SSPN	350	1.88	2	12				
					Longnose Skate	554	119.4	8	13				
					Giant Wrymouth	760	13.8	1	13				
					Spiny Dogfish	66	122.94	36	13				
					Redbanded	308	5.8	2	13				
					Rosethorn	309	2.1	2	13				
					Arth	141	238.21	44	13				
					Urchin	54	.3	1	13				
					Starfish	20	.9	2	13				
					Sandpaper	555	5.4	2	13				
					Hagfish	67	.9	1	13				

Trawl Sample Methods : 1-Whole haul species 2-Single basket 3-Multiple basket Fixed Gear Sample Methods 4-FG Sample 5-FG(Verified Fish Ticket) 6-FG(Unverified Fish Ticket) Species Composition Form v.4
Reasons for Discard: 11-Incidental/Accidental 12-Drop-off 13-Market 14-Other 15-Predation 16-Regulation 17- Safety January 2006

CHAPTER 5
Fixed Gear Sampling

Species Composition Measurements and Calculations

R or D	Catch Category	Density Samples	Measurements, Formulas, and Calculations	Total Weight
R	ZMIS		SABL 74 @ 496.9 lbs SABL = $\frac{496.9 \text{ lbs} \times 381 \text{ fish}}{74 \text{ fish}} = 2558.363513$ Discarded DO = $\frac{496.9 \text{ lbs} \times 12 \text{ fish}}{74 \text{ fish}} = 80.57837836$	
D	ZMIS		Pred = $\frac{496.9 \text{ lbs} \times 1 \text{ fish}}{74 \text{ fish}} = 6.714864864$ Small Sabl $\frac{2.7 \text{ lbs} \times 3 \text{ fish}}{1 \text{ fish}} = 8.1 \text{ lbs}$ SSPN (DO) $\frac{12.2 \text{ lbs} \times 2 \text{ fish}}{13 \text{ fish}} = 1.876923076$	
			DSRK $\frac{68.3 \text{ lbs} \times 36 \text{ fish}}{20 \text{ fish}} = 122.94 \text{ lbs}$ Redbanded $\frac{2.9 \text{ lbs} \times 2 \text{ fish}}{1 \text{ fish}} = 5.8 \text{ lbs}$	
			ARTH $\frac{157 \text{ lbs} \times 44 \text{ fish}}{29 \text{ fish}} = 238.2068965$	
		PHLB 8.77 (1) 13.51 (4) 19.8 (2) = 385.09 lbs 27.87 (6) 50.29 (1) 65.17 (1) 15		

Pots

Haul #		FIXED GEAR CATCH FORM*										Page _1_ of _2_	
Date		Trip Number		USCG #									
Catch #	R or D	Catch Category	Sample Weight	#'s of Fish Reg. for wt. methods 4, 6, 9	# Hooks/Pots sampled by catch category	Weight Method	Catch Purity	Discard Reason	Vessel Estimate	Comments			
1	R	ZMIS	221.30		12	13	P						
2	D	ZMIS	260.27		12	13	M						
Keypunch Checks			481.57		24								

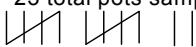
*Gear Types 6, 7, 8, 9, 10, 15, 16

CHAPTER 5

Fixed Gear Sampling

Official Total Catch Calculations

Gear Units
Sampled 23 total pots sampled



Average Soak
Time/Gear Unit:


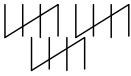


hooks/gear unit:

Retained

WTS
3 @ 16.94
5 @ 27.85
3 @ 17.78
6 @ 32.88
8 @ 44.27
6 @ 50.84



Discarded

SABL	Smalls (market)		smalls
	Predated		1 @ 3.78
			1 @ 3.99
			1 @ 4.03
			2 @ 7.05
<hr/>			
Tanner	191 – tallied		tanner
			19 @ 15.83
			34 @ 21.35
<hr/>			
Viper fish	1 @ .10		
<hr/>			
Crinoids			5 @ .20 lbs
<hr/>			
Hair Crab			2 @ 3.17
<hr/>			

OTC = $\frac{481.57 \text{ lbs}}{12 \text{ pots}} \times 23 \text{ pots} = 923.0091665 \text{ lbs}$

CHAPTER 5

Fixed Gear Sampling

Haul #	0	1
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SPECIES COMPOSITION FORM

Page 2 of 2

Date	0	7	0	4	0	5
------	---	---	---	---	---	---

Trip Number			6	7	4
-------------	--	--	---	---	---

USCG #	4	2	0	6	1	3	
--------	---	---	---	---	---	---	--

[illegible]

Trawl Sample Methods : 1-Whole haul species 2-Single basket 3-Multiple basket Fixed Gear Sample Methods 4-FG Sample 5-FG(Verified Fish Ticket) 6-FG(Unverified Fish Ticket) Species Composition Form v.4
Reasons for Discard: 11-Incidental/Accidental 12-Drop-off 13-Market 14-Other 15-Predation 16-Regulation 17- Safety
January 2006

CHAPTER 5
Fixed Gear Sampling

Species Composition Measurements and Calculations

R or D	Catch Category	Density Samples	Measurements, Formulas, and Calculations	Total Weight
R	ZMIS		<p>SABL 31 @ 190.56</p> <p><u>190.56 lbs x 36 fish = 221.2954838</u> 31 fish</p> <p>Predated (D)</p> <p><u>190.56 lbs x 15 fish = 92.20645161 lbs</u> 31 fish</p>	
D	ZMIS		<p>SABL (13) 5 @ 18.85</p> <p><u>18.85 lbs x 8 fish = 30.16 lbs</u> 5 fish</p> <p>Tanner 53 @ 37.18 lbs</p> <p><u>37.18 lbs x 191 = 133.9883018 lbs</u> 53 fish</p>	
			<p>Crinoids 5 @ .20 lbs</p> <p><u>.20 lbs x 16 fish = .64 lbs</u> 5 fish</p>	

